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Application Number	10/660,054
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First Named Inventor	Shigeru YAMANE, et al.
Art Unit	1774
Examiner Name	Merrick L. Dixon
Attorney Docket No.	MAT-8260US1

ENCLOSURES (Check all that apply)

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 - ☐ Affidavits/Declaration(s)
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- ☐ Information Disclosure Statement
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- ☐ Response to Missing Parts/
Incomplete Application
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under 37 CFR 1.52 or 1.53

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Date	September 13, 2006	Registration No.	34,515

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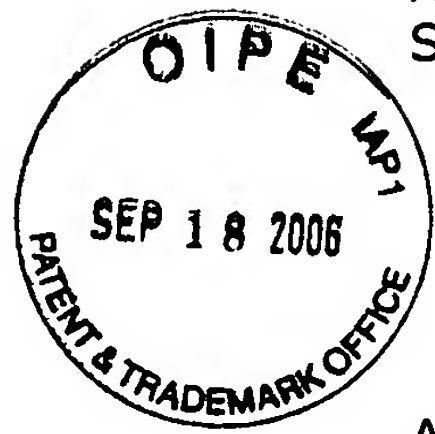
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Application No.: 10/660,054
Substitute Appeal Brief Dated: September 13, 2006

MAT-8260US1



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appln. No: 10/660,054
Appellants: Shigeru YAMANE, et al.
Filed: September 11, 2003
Title: METHOD OF MANUFACTURING CLAD BOARD FOR FORMING
CIRCUITRY, CLAD BOARD AND CORE BOARD FOR CLAD BOARD
TC/A.U.: 1774
Examiner: Merrick L. Dixon
Confirmation No.: 7291
Docket No.: MAT-8260US1

SUBSTITUTE APPEAL BRIEF

Mail Stop Appeal Brief-Patents

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Communication dated **September 8, 2006**, Appellant is submitting this Substitute Appeal Brief for the above-identified application. The Appeal Brief fee was previously paid.

Further to the Notice of Appeal dated November 16, 2005, and responsive to the Office Action dated May 18, 2006, Appellants are reinstating the Appeal and submitting this Appeal Brief for the above-identified application.

This Brief is presented in the format required by 37 C.F.R. § 41.37, in order to facilitate review by the Board. In compliance with 37 C.F.R. § 41.37(a)(1), this Brief is being filed within the time allowed for response to the action from which the Appeal was taken or within two months from the date of the Notice of Appeal, whichever is later.

I. REAL PARTY IN INTEREST

The real party in interest is Matsushita Electric Industrial Co., Ltd.

II. RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 37, 40, 41, 44, 47, 59, 66, 69, 70, 73, and 76 are pending. Claims 1-36, 38, 39, 42, 43, 45, 46, 48-58, 60-65, 67, 68, 71, 72, 74, 75, and 77-82 have been canceled. Claims 37, 40, 41, 44, 47, 59, 66, 69, 70, 73, and 76 have been appealed.

IV. STATUS OF AMENDMENTS

No amendments have been filed subsequent to the Office Action dated May 18, 2006.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The claims on appeal are apparatus claims. The present invention, as recited in claim 37, is a clad board for forming circuitry comprising a fiber sheet included in the pre-preg sheet, resin material impregnated into the fiber sheet, the resin material including at least one of thermoplastic resin and thermosetting resin having a semi-cured portion; and a resin layer formed smoothly on the fiber sheet, the resin layer being made of a material identical to the resin material. Even though claim 37 recites method steps, Appellants do not rely on the method steps for the patentability of claim 37 or any other claim on appeal.

The claimed feature of the fiber sheet included in the pre-preg sheet is found in Appellants' specification at page 5, lines 9 to 13 and Figures 1A, 1B. Fig. 1B is a sectional view of the pre-preg sheet taken along line 1B-1B in Fig. 1A. As shown, pre-preg sheet 1 is a composite material including a non-woven fabric of aromatic polyamide fibers (also referred to as aramid fibers) as the fiber sheet.

The claimed feature of resin material impregnated into the fiber sheet is found in Appellants' specification at page 5, lines 9 to 13, at page 7, lines 19 to 23, and Figures 1A, 1B. The resin material is formed from a thermosetting resin (e.g. epoxy resin) and is impregnated into the fiber sheet and is shown in Fig. 1B as impregnated

resin 7. Further, the impregnated resin is not completely cured but includes semi-cured portions (i.e. impregnated resin 7 is a B-stage epoxy resin).

The claimed feature of a resin layer formed smoothly on the fiber sheet is found in Appellants' specification at page 6, lines 9 to 12, at page 6, line 24 to page 7, line 8, at page 11, line 25 to page 12, line 9, and Figures 1B, 3. As shown in Fig. 1B, a resin layer 8 is smoothly formed on top of the fiber sheet 6, the resin layer 8 is made of resin material identical to the resin material impregnated into the fiber sheet 6.

A critical matter is the smoothness of pre-preg sheet 1, which is made possible by the smoothness of resin layer 8, as shown in Figures 1B, 3 and 4A-4F. The smoothness of the resin layer 8 is achieved by heating the resin as it is applied as a layer to the resin impregnated fiber sheet 6 (page 6, lines 24-25) or by drawing a sharp metal blade across the surface of resin layer 8 to achieve the required smoothness and thickness of the resin layer 8 (Fig. 3). As shown in Fig. 4A, the release film 2 is uniformly contacted to the pre-preg sheet 1, by passing both through a heating roller, without producing gaps. Through holes 3 are formed in the release coated pre-preg sheet (Fig. 4B) and then filled with conductive paste 4 (Fig. 4C). The conductive paste 4 remains within the hole 3 and does not spread out between the pre-preg sheet 1 and release film 2. The release film 2 is removed (Fig. 4D) and metal foils 5 are pressed on to both faces of the pre-preg sheet (Fig. 4E). Both faces become electrically conductive with each other when the sheets are heated and compressed (Fig. 4F) and the metal foils are etched for patterning, thereby forming circuits. The smoothness of the pre-preg sheet 1 further provides stable, strongly adhered circuit patterns as metal foils are heat pressed on to the pre-preg sheet 1 (Figs. 4E, 4F). Thus, short circuits between adjacent circuit patterns formed by selectively etching the metal foil 5 are prevented as a consequence of the smooth pre-preg sheet.

The core board for the clad board, as recited in claim 66, has nearly identical features as those recited in claim 37. The features recited in claim 66 are found in Appellants' specification at page 3, line 26, at page 5, lines 9 to 13, at page 6, line 24 to page 7, line 8 and Figures 1A, 1B, 3.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Appellants are reinstating their Appeal Brief filed January 19, 2006, after receiving the Office Action dated May 18, 2006, thrice rejecting claims 37, 40, 41, 44, 47, 59, 66, 69, 70, 73 and 76. Paragraph 2 of the Office Action rejected claims 37, 47, 59 and 66 under 35 U.S.C. § 102(b) as being anticipated by Haas et al. (U.S. Patent No. 6,224,965). Paragraph 4 of the Office Action rejected claims 40, 41, 44, 69, 70, 73 and 76 under 35 U.S.C. § 103(a) as unpatentable over Haas et al. in view of Nakatani et al. (U.S. Patent No. 6,096,411).

VII. ARGUMENT

35 U.S.C. § 102(b) Rejection

Claims 37, 47, 59 and 66 have been rejected under 35 U.S.C. § 102(b) as unpatentable over Haas et al. (U.S. Patent No. 6,224,965). It is respectfully submitted, however, that these claims are patentable over the art of record for the reasons set forth below.

Appellants' invention, as recited by claims 37 and 66, includes a feature that is neither disclosed nor suggested by Haas et al., namely:

Claim 37

resin material impregnated into the fiber sheet, the resin material including at least one of thermoplastic resin and thermosetting resin having semi-cured portion; and

a resin layer formed smoothly on the fiber sheet, the resin layer being made of material identical to the resin material. (Emphasis added)

Claim 66

resin material impregnated into the fiber sheet, the resin material including at least one of thermoplastic resin and thermosetting resin having semi-cured portion; and

a resin layer formed on the fiber sheet, being made of material identical to the resin material. (Emphasis added)

Thus, the claims describe the resin layer smoothly formed on the fiber sheet as being made of material identical to the resin material impregnated into the fiber sheet.

Figure 1 of Haas et al., for example, shows a double-side printed wiring board composed of a core 10, two circuit layers 12 and 14, and two prepregs 16 and 18 placed on circuit layers 12 and 14 of core 10.

Prepregs of Haas et al., however, are made using non-woven microfiber glass (Col. 4, lines 29-43) by impregnating a resin into the micro-fiber glass (Col. 4, line 62 to Col. 5, line 22; Col. 5, lines 49-51). There is no disclosure or suggestion in Haas et al. of a resin layer formed smoothly on the fiber sheet, the resin layer being made of resin identical to the impregnating resin. Further, Haas et al. is silent with regard to the smoothness or roughness of the surface of the prepreg board.

Paragraph 2, on page 2 of the Office Action contends Haas et al. anticipates the claimed clad board and core board. Appellants' respectfully disagree. In making a rejection under 35 U.S.C. § 102(b), the Office is obligated to provide a reference that must teach each and every element of the claim. MPEP § 2131 and MPEP § 706.02. The Haas et al. reference does not teach Appellants' claimed feature of a resin layer formed smoothly on the fiber sheet, the resin layer being made of material identical to the resin material impregnated into the fiber sheet. Appellants' respectfully request the Board to reverse the Section 102(b) rejection of claims 37 and 66 as anticipated by Haas et al.

The Office also has relied on Haas et al. to reject dependent claims 47 and 59. Because claims 47 and 59 depend on claim 37, they are likewise not subject to the Section 102(b) rejection for at least the reasons set forth above with respect to claim 37. Appellants respectfully request the Board to reverse the Examiner's Section 102(b) rejection of claims 47 and 59.

35 U.S.C. § 103(a) Rejection

Claims 40, 41, 44, 69, 70, 73 and 76 have been rejected under 35 U.S.C. § 103(a) as unpatentable over Haas et al. (U.S. Patent No. 6,224,965) in view of Nakatani et al. (U.S. Patent No. 6,096,411). It is respectfully submitted, however,

that these claims are patentable over the art of record for the reasons set forth below.

Appellants' invention, as recited in claims 40, 41 and 44, includes features that are neither disclosed nor suggested by Haas et al., Nakatani et al. or the combination of the references, namely:

Claim 40

The clad board of claim 37, wherein the fiber sheet has a density ranging from 700 kg/m^3 to 1000 kg/m^3 .

Claim 41

The clad board of claim 37, wherein the fiber sheet includes:

A first layer disposed at a surface of the fiber sheet, and a second layer having a density lower than a density of the first layer.

Claim 44

The clad board of claim 37, wherein the fiber sheet includes;

A first layer; and a second layer having a density different from a density of the first layer.

Likewise, Appellants' invention, as recited in independent claims 69, 70 and 73 have the identical respective features as recited in claims 40, 41 and 44.

Paragraph 4, on page 2 of the Office Action contends that it would have been obvious to arrive at Appellants' claimed features from the combined teachings of Haas et al. and Nakatani et al. Appellants respectfully disagree.

Haas et al. is relied on by the Examiner to disclose fiber sheet density and density differences in resin layers of the prepregs. However, Haas et al. is silent with respect to the density of the micro-fiber glass in the prepreg sheet and only refers to high density circuitry (Col. 1, lines 26-30). Nakatani et al. is also relied on by the Examiner to disclose both fiber sheet density and density differences in the resin layers. However, the disclosure relied on by the Examiner in the Office Action (Col. 6, lines 11-19) refers to using an epoxy resin to disperse conductive fillers 30 at high

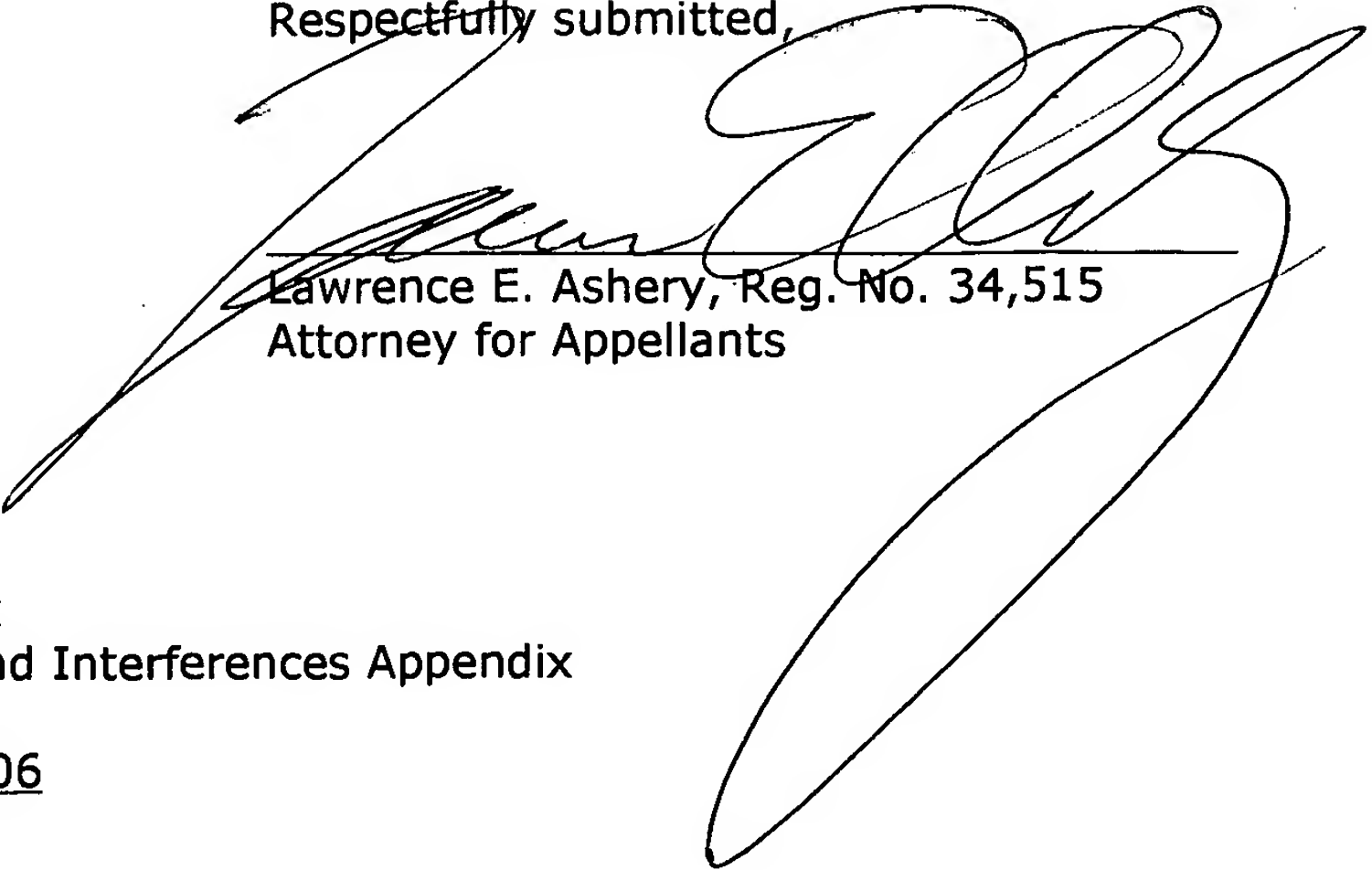
density, as shown in Figure 2C of Nakatani et al. The feature relied on is not claimed by Appellants nor is it relevant to Appellants' claimed invention. Further, Nakatani et al. does not disclose or suggest resin layers in a pre-preg sheet. Nakatani discloses only a pre-preg sheet, which is made up of glass fiber or aramid fiber impregnated with uncured thermosetting resin (Col. 8, lines 9-16). Moreover, Nakatani et al. is silent regarding the density of the fiber sheet claimed by Appellants' claims 40 and 69 and the density of first and second resin layers as claimed by Appellants in claims 41, 44, 70, 73 and 76.

Appellants submit that a *prima facie* case of obviousness under 35 U.S.C. § 103(a) has not been established. As set forth in MPEP § 2143, three basic criteria must be met. First, there must be some suggestion or motivation to combine the references. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all of the claim limitations. For at least the reasons noted herein, Appellants' contend that a *prima facie* case of obviousness has not been established. In particular, the prior art references as combined fail to teach or suggest all of the claim limitations. In particular, neither of the references discloses or suggests Appellants' claimed fiber sheet density or the claimed difference in density of resin layers.

Furthermore, it would not have been obvious to one skilled in the art to substitute a resin used for dispensing conductive filler, disclosed in Nakatani et al., to achieve Appellants' invention as recited in claims 40, 41, 44, 69, 70, 73 and 76. *In re Fritch*, 23 USPQ 2d 1780 at n.12 (Fed. Cir. 1992) (a proposed modification to a prior art reference cannot be used to reject claims if the proposed modification would render the prior art device inoperable for its intended purpose); *In re Gordon*, 221 USPQ 1125, 1127 (Fed. Cir. 1984) (a prior art reference teaches away from the USPTO's proposed modification if the proposed modification would render the prior art device inoperable for its intended purpose).

In view of the arguments set forth above, the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,



Lawrence E. Ashery, Reg. No. 34,515
Attorney for Appellants

LEA/bj

Enclosure: Claims Appendix
Evidence Appendix
Related Appeals and Interferences Appendix

Dated: September 13, 2006

P.O. Box 980
Valley Forge, PA 19482
(610) 407-0700

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September 13, 2006



Beth Johnson

APPENDIX OF CLAIMS

1-36. (Cancelled).

37. (Original) A clad board for forming circuitry, being manufactured through:

sticking a releasing film to a pre-preg sheet;

forming a hole in the pre-preg sheet with the releasing film, the hole being one of a non-through-hole and a through-hole;

filling the hole with conductive paste;

peeling off the releasing film; and

heating and pressing a metal foil onto the pre-preg sheet,

said clad board comprising:

a fiber sheet included in the pre-preg sheet;

resin material impregnated into the fiber sheet, the resin material including at least one of thermoplastic resin and thermosetting resin having semi-cured portion; and

a resin layer formed smoothly on the fiber sheet, the resin layer being made of material identical to the resin material.

38-39. (Cancelled).

40. (Previously Presented) The clad board of claim 37,

wherein the fiber sheet has a density ranging from 700kg/m^3 to 1000kg/m^3 .

41. (Previously Presented) The clad board of claim 37,

wherein the fiber sheet includes;

a first layer disposed at a surface of the fiber sheet; and

a second layer having a density lower than a density of the first layer.

42-43. (Cancelled).

44. (Previously Presented) The clad board of claim 37,

wherein the fiber sheet includes;

a first layer; and

a second layer having a density different from a density of the first layer.

45-46. (Cancelled).

47. (Previously Presented) The clad board of claim 37,

wherein the fiber sheet includes;

first and second layers disposed at respective surfaces of the fiber sheet; and

a third layer located between the first and second layers, the third layer having a density lower than respective densities of the first and second layers.

48-58. (Cancelled).

59. (Previously Presented) The clad board of claim 37,

wherein the fiber sheet has a hole formed therein, said clad board further comprising a conductive paste filling the hole of the fiber sheet, the conductive paste including a conductive particle shaped in non-spherical.

60-65. (Cancelled).

66. (Original) A core board for a clad board for forming circuitry, comprising:

a fiber sheet;

resin material impregnated into the fiber sheet, the resin material including at least one of thermoplastic resin and thermosetting resin having semi-cured portion; and

a resin layer formed on the fiber sheet, being made of material identical to the resin material.

67-68. (Cancelled).

69. (Previously Presented) The core board of claim 66,
wherein the fiber sheet has a density ranging from 700kg/m^3 to 1000kg/m^3 .

70. (Previously Presented) The core board of claim 66,
wherein the fiber sheet includes;
a first layer disposed at a surface of the fiber sheet; and
a second layer having a density lower than a density of the first layer.

71-72. (Cancelled).

73. (Previously Presented) The core board of claim 66,
wherein the fiber sheet includes;
a first layer; and
a second layer having a density different from a density of the first layer.

74-75. (Cancelled).

76. (Previously Presented) The core board of claim 66,
wherein the fiber sheet includes;
first and second layers disposed at respective outermost sides of the fiber sheet; and

a third layer located between the first and second layers, having a density lower than respective densities of the first and second layers.

77-82. (Cancelled).

EVIDENCE APPENDIX

None.

RELATED APPEALS AND INTERFERENCES APPENDIX

None